CODAN

HF RADIO COMMUNICATIONS

2110 series Manpack Transceiver

Getting Started Guide

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Introduction

Thank you for purchasing a Codan 2110 series Manpack Transceiver. With this great product and Codan's supreme after-sales support, you can look forward to many years of clear and reliable HF communication. Please read this guide thoroughly and retain it for future reference. There is an index at the end of this guide to assist you in finding information.

The 2110 series Manpack Transceiver is a self-contained, lightweight, waterproof and rugged communication system.

The 2110v Manpack Transceiver provides basic voice-only operations. The 2110 Manpack Transceiver provides full voice and data capabilities, interfaces with a 9350 Automatic Tuning Whip Antenna, and is interoperable with MIL-STD-188-141B ALE, if installed. Voice encryption, digital encryption, and internal data are available as options.

Overview of this guide

This guide provides instructions on how to get started with your 2110 series Manpack Transceiver. It assumes that you have limited knowledge of HF communication and of using an HF transceiver.

Extensive reference material is provided on the CD at the back of this guide.

This guide contains the following sections:

Section 1 The front panel—describes the front panel and the function of items on the front panel

Section 2 Getting started—explains how to use the basic operating features of your transceiver

Section 3 CES-128 voice encryptor option—describes how to use the optional CES-128 voice encryptor feature

Section 4	AES-256 digital encryptor option—describes how to use the optional AES-256 digital encryptor feature
Section 5	Data modem option—describes the optional on-board data modem and how to connect the transceiver to a computer
Section 6	Your 2110 series Manpack Transceiver—shows the components that make up your transceiver
Section 7	Preparing the transceiver for use—explains how to check that the transceiver and battery pack are ready for use
Section 8	Troubleshooting—provides solutions for common operational issues for the 2110 series Manpack Transceiver
Appendix A	Entering and editing text—explains how to enter and edit text in editable screens
Appendix B	Using Quick Start—explains how to use the Quick Start feature, if enabled
Appendix C	Using a GPS receiver—explains the information provided by the GPS receiver, if fitted
Appendix D	Battery care—describes how to store and dispose of your battery
Appendix E	HF radio transmission—describes the medium of HF communication and how to use it effectively
Appendix F	Definitions—explains the terms and abbreviations used in this guide
Appendix G	Compliance—provides compliance information and safety notices for your transceiver
Appendix H	Warranties—explains the warranties associated with the components of the 2110 series Manpack Transceiver

Accessing the CD

To access the CD:

- ❑ Place the CD in the CD drive of your computer.

  You can view and search the Reference Manual and Getting Started Guide using the Adobe® Reader® supplied on the CD.

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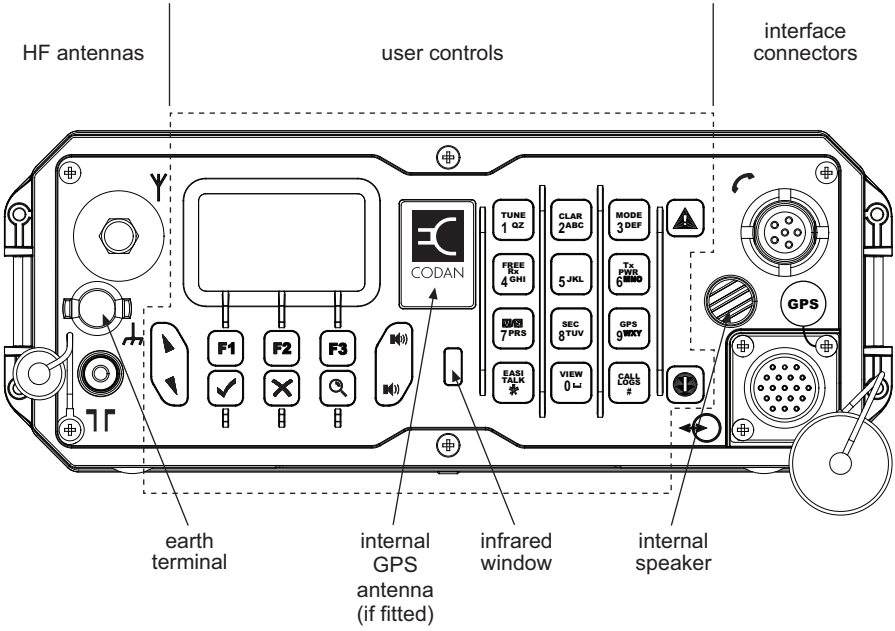
1 The front panel

Overview

The front panel has three main areas: user controls, connectors and HF antennas, as shown in Figure 1.

Figure 1: The front panel (2110 model shown)



NOTE

The 2110v Manpack Transceiver uses a 5-way connector in place of the 19-way GPIO connector (⟲) on the 2110 Manpack Transceiver.

NOTE The **GPS** connector is optional for the 2110 Manpack Transceiver. It is not available for the 2110v.

User controls

The user control area comprises:

- an LCD
- navigation keys (, , , ,)
- volume controls (,)
- soft function keys (**F1**, **F2**, **F3**) corresponding to the function displayed above the key on the front panel screen
- alphanumeric keys (**0**–**9**, *, **#**)
- emergency key ()
- power key ()

There are two ways to use the keys on the front panel. You can:

- press a key, briefly
- *hold* a key for 2 seconds

The Tick and Cross keys

Press to:

- select the item on the active line in the list
- save changes
- answer ‘yes’ to prompts

Hold to edit settings.

Press ✕ to:

- navigate up from settings to entries
- backspace over text
- remove messages on the screen
- cancel changes
- answer ‘no’ to prompts

Hold ✕ to go from any location to the home screen. If you have entered text into a setting and want to discard the changes you made, *hold* ✕.

The scroll keys

The ◣ and ◥ keys are the scroll keys. Use these keys to scroll up or down through any list, to scroll left or right over text, and to increase or decrease a value.

Interface connectors

The interface connector area comprises:

- the 6-way handset connector (↷)
- the 19-way GPIO connector (⟲) (2110 only)
- the 5-way connector (⟲) (2110v only)
- the optional external GPS antenna connector (**GPS**) (2110 only)

HF antennas

The HF antenna area comprises:

- the antenna stud (Ψ) for tuned antennas (whip antennas and the adaptor for the long wire antenna)
- the 50 Ω connector (⌐¬) for broadband antennas (end-fed broadband, broadband dipole, and wire dipole antennas)

Hot keys

Hot keys enable you to perform a task quickly. The transceiver comes with some standard hot keys programmed; the keys are labelled with the corresponding task performed. You can also create your own hot keys (see the reference material on the enclosed CD).

Table 1: Standard hot keys

Hot key	Function
F1	Pressing **F1** performs the macro assigned to this soft function key. By default, **MUTE** is assigned to this key, so pressing **F1** toggles mute on or off.
F2	Pressing **F2** performs the macro assigned to this soft function key. By default, **CALL** is assigned to this key, so pressing **F2** starts a call.
F3	Pressing **F3** performs the macro assigned to this soft function key. By default, **SCAN** is assigned to this key, so pressing **F3** switches off scanning, or if you were in a call, ends the call and switches scanning on.
Hold **MUTE**	*Holding* **MUTE** toggles the front panel speaker on or off.
TUNE	Pressing **TUNE** displays the **PTT tunes** screen so you can manually tune the antenna.
CLAR	Pressing **CLAR** enables you to adjust the receive frequency to compensate for any frequency offset between your transceiver and the remote transceiver.
MODE	Pressing **MODE** selects the next allowable mode programmed for the channel, usually USB or LSB.
FREE Rx	Pressing **FREE Rx** enters Free Tune mode in which you can adjust or enter a receive frequency.

Table 1: Standard hot keys (cont.)

Hot key	Function
Tx PWR	Pressing **Tx PWR** toggles the transmission power of the transceiver between Hi (25 W) and Lo (5 W). NOTE If a Codan 3160 Power Amplifier is detected, PA is also included in the power options.
V/S	Pressing **V/S** toggles the mute type between Voice mute and Selcall mute. NOTE If an AES-256 digital encryptor is fitted to the transceiver and switched on, digital voice only mute (D) may also be selected.
SEC	Pressing or *holding* **SEC** enters Secure mode, if the hardware option is fitted, and specific firmware is programmed into the transceiver and enabled. For more information see page 25, *CES-128 voice encryptor option* and page 41, *AES-256 digital encryptor option*.
GPS	Pressing **GPS** displays your current GPS position, if the hardware option is fitted and enabled.
EASITALK	Pressing **EASITALK** toggles the DSP noise reduction algorithm on or off.
VIEW	Pressing **VIEW** toggles between the channel screen and the Address List.
CALL LOGS	Pressing **CALL LOGS** repeatedly steps through a number of call logs: Calls Out, Calls In, Last Heard, then back to the screen from which you began. In these logs, you can view the details of the calls or detected stations. The Last Heard log is only available if you have the MIL-STD-188-141B ALE option installed (2110 only).
⚠ (Emergency)	*Holding* ⚠ begins an automatic Emergency call transmission using call information contained in the Emergency entries in the Address List.
⏻ (Power)	Pressing ⏻ toggles the screen and keypad backlighting between the default setting and off.

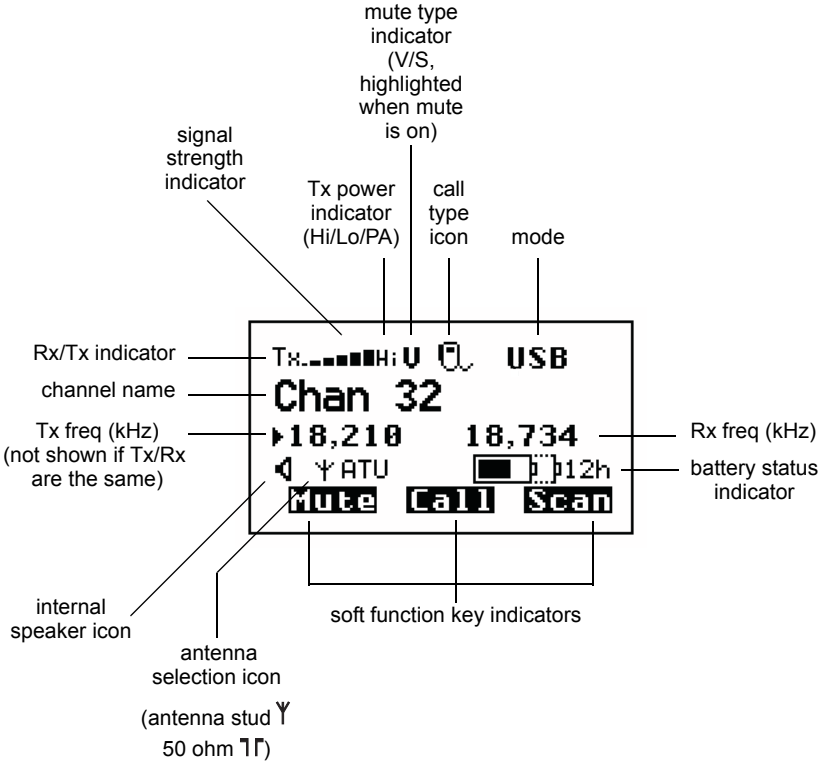
Table 1: Standard hot keys (cont.)

Hot key	Function
ⓘ + **9**	Pressing ⓘ + **9** enables you to change the default setting for the screen contrast.
ⓘ + **0**	Pressing ⓘ + **0** enables you to change the default setting for the screen and keypad backlighting.
ⓘ + ⚠	Pressing ⓘ + ⚠ enables you to clear certain configuration settings from the transceiver, then shut it down immediately.

The channel screen

The channel screen is displayed when you press ✕ or **VIEW**.

Figure 2: The channel screen in the Channel List

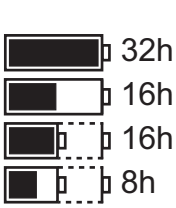


When the transceiver is scanning, the call type icon is replaced by the scanning icon and the channel information is replaced by **Scanning**.

Battery status indicator

The channel screen displays a battery status indicator. The indicator graphically shows the state of charge and the state of health of the battery pack.

Figure 3: Battery status indicator



	State of charge	State of health
32h	100%	100%
16h	50%	100%
16h	100%	50%
8h	50%	50%

State of charge

The state of charge indicates graphically how much charge is remaining in the battery pack. The battery pack continuously monitors the current consumption of the transceiver and calculates the remaining hours of use assuming a Tx to Rx ratio of 1:9.

State of health

Rechargeable batteries have a limited lifetime and a limited number of times that they may be charged and discharged. Over time, the total amount of charge that a battery pack may hold decreases. The state of health indicates graphically how much charge a battery pack can still hold, relative to when it was new.

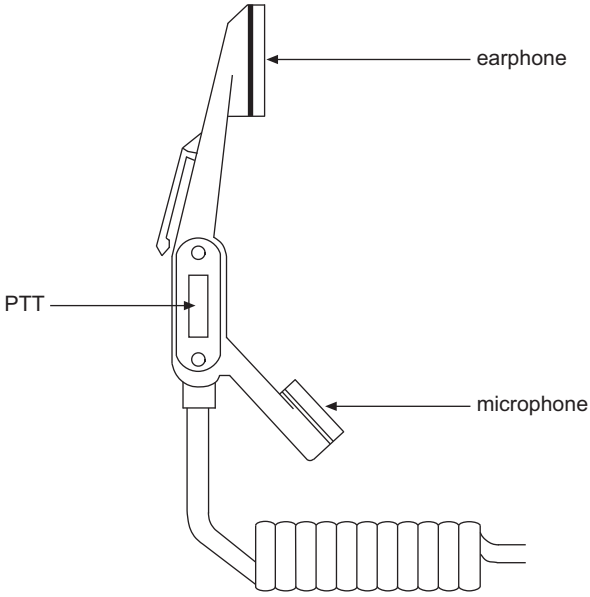
A low state of health indicates that the battery pack may need replacing.

NOTE When charging a new battery pack, it may show a low state of health until it has been fully charged and discharged several times.

The handset

The 2110 series Manpack Transceiver supports standard audio accessories using H-229 type connectors. The handset is a standard issue, lightweight, tactical H-250/U type, with built-in earphone, noise-cancelling microphone, and PTT button. It is connected to the 6-way connector on the front panel of the transceiver.

Figure 4: The handset



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2 Getting started

This section contains the following topics:

WARNING

You should not transmit from your transceiver or tune the antenna unless people are beyond the safe working distance of:

- 1.5 m (5 ft) of any part of a mobile antenna (2110 only)
- 0.2 m (8 in) from a long wire, end-fed broadband, broadband dipole, or wire dipole antenna
- 0.6 m (2 ft) from any whip antenna

Switching on the transceiver

NOTE

Prior to operational use, you should connect an antenna to the transceiver (see page 72, *Selecting an appropriate tactical antenna* and the *Quick Reference Card* supplied with the antenna).

To switch on the transceiver:

- ❑ Press ⏻.

  If you are prompted to enter a password, enter your user or administrator password, then press ✓.

  If you enter an incorrect password it is automatically erased. If you enter an incorrect password three times, the transceiver automatically switches off.

  When the transceiver is switched on, it runs a self-test that checks the memory, hardware, LCD and keys.

Switching off the transceiver

To switch off the transceiver:

- ❑ *Hold* ⏻.

  The transceiver is switched off.

Setting up basics

NOTE

Basic information for the transceiver, such as channels, self addresses, time and date, and enabling channels for scanning, should be set up by your system administrator using the NGT System Programmer software. If Quick Start is enabled you can enter some of this information (see page 83, *Using Quick Start*).

Selecting a channel

To select a channel:

- ❑ Press **VIEW** until the channel screen is displayed.

  If scanning is on, press **SCAN** to switch it off.

- ❑ Scroll through the channels in the list. Stop scrolling when the channel you want is displayed.

  The channel is selected.

- ❑ If you want to change the sideband or IF filter settings, press **MODE**.

  If the mode does not change, there is only one mode for the channel.

NOTE If you have an automatic antenna fitted, press PTT to tune the antenna to the currently selected channel.

Making a basic voice call

To make a basic voice call:

- ❑ Select the channel that you want to use (see page 18, *Selecting a channel*).
- ❑ *Hold down* PTT then speak, releasing PTT when you have finished speaking.

Muting the transceiver

If you do not want to listen to on-air noise, you can mute the transceiver so that you only hear voice traffic on the channel.

To switch mute on or off:

- ❑ Press **MUTE**.

  When the channel screen is displayed, the mute status is indicated by a V (Voice) or S (Selcall) at the top centre of the screen.

  NOTE — If an AES-256 digital encryptor is fitted to the transceiver, Digital Voice Only mute (D) may also be selected.

  If the letter is highlighted, mute is on.

  If the letter is not highlighted, mute is off.

- ❑ Press **V/S** until V is displayed on the channel screen.

  The transceiver remains muted until it detects voice traffic on the channel.

Making a selective call

NOTE The call types available depend upon the options installed in your transceiver.

To make a selective call:

- ❑ Press **CALL**.
- ❑ Enter the address of the station you want to call, scroll to the type of call you want to make, then press **CALL**.

Call type	Icon	Used for...
Channel Test		Testing the audible quality of a channel in a Codan Selcall or Open Selcall network. Replacing LQA information for an ALE/ CALM network (if you have the MIL-STD-188-141B ALE option installed, 2110 only).
Emergency		Sending an emergency alert tone with a call.
Get Position		Requesting the location of a remote transceiver with a GPS receiver connected and enabled, or with a GPS position entered in the My GPS entry in the Address List of the remote transceiver.
Get Status		Requesting diagnostic or configuration information from a remote transceiver.
Message		Sending a message to a remote transceiver.
Phone		Sending a call to a radio/telephone interconnect unit, which connects the call to the public telephone network.

Call type	Icon	Used for...
Selective		Sending a selective call to a remote transceiver.
Send Position		Sending your GPS position to a remote transceiver. A GPS receiver must be fitted and enabled in your transceiver, or a GPS position must be entered in the My GPS entry in the Address List.

- ❑ If you are prompted for details about the call, use the information in the following table to enter them, then press **CALL**.

If this prompt is displayed...	Do this...
Select network	• select the network in which you want to make the call
My address?	• select or enter the self address from which you want to send the call
Select chan/mode	**In an ALE/CALM network:** • select **<auto>** if you want the transceiver to select the best channel/mode for the call, starting with the channel on which the most recent successful link was established, or • select the channel/mode you want to use to make the call, or • if you have the MIL-STD-188-141B ALE option installed (2110 only), press 🔍 to select the best channel/mode combination from the LQA database **In a Codan Selcall network:** • select the channel/mode you want to use to make the call and check that it is clear of voice and data traffic

NOTE To abort the call before a connection to the other station is made, press PTT.

- ❑ If you made the call in:
  - an ALE/CALM network, wait until a message informs you that the call has been successful (this means your call has been automatically answered by the other station)
  - a Codan Selcall network, wait until a message informs you that the call has been sent and listen for audible beeps transmitted from the other station
- ❑ *Hold down* PTT then speak.

  Release PTT when you have finished speaking.

NOTE

If you have the MIL-STD-188-141B ALE option installed (2110 only) and made the call using a special ALE address syntax, you are able to send data within the established link by pressing **CALL** and following the prompts.

- ❑ To end the call, press **SCAN**.

  The transceiver resumes scanning.

Scanning channels

Before you can switch scanning on, you need to allocate some channels to be scanned. If Quick Start is available, you can create a scan list from channels programmed into the transceiver (see page 83, *Using Quick Start*). If this feature is not available, your system administrator must allocate some channels to a network, then enable scanning of this network.

Switching scanning on or off

To switch scanning on or off:

- ❑ Press **SCAN**.

  Scanning is toggled on or off.

  NOTE **SCAN** is also used to end a call then resume scanning.

When scanning is switched on, mute is also switched on.

If you press PTT while the transceiver is scanning, the scan is paused.

Pausing scanning

To pause scanning:

- ❑ Do one of the following:
  - To pause scanning on the current channel/mode, press ✓.
  - To pause scanning and scroll to another channel/mode, press ◣ or ◥.

  The channel/modes through which you can scroll are those in the networks that were being scanned. They are not listed alphabetically but in the order in which they were being scanned.

  If you do not press a key within 30 seconds, the transceiver automatically resumes scanning.
- ❑ While scanning is paused, do one or more of the following:
  - To speak on air, *hold down* PTT.
  - To resume scanning immediately, press ✓.

3 CES-128 voice encryptor option

This section contains the following topics:

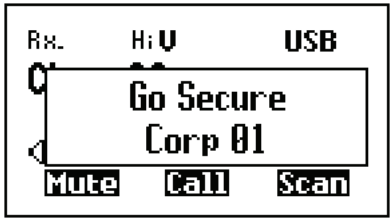
NOTE The CES-128 voice encryptor is an optional feature.

Using the CES-128 voice encryptor

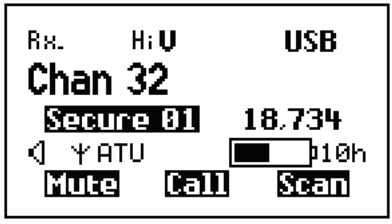
To use the CES-128 voice encryptor:

- ❑ Start a call (see page 20, *Making a selective call*).
- ❑ Press **SEC**.

  The transceiver responds with two high short beeps, and displays **Go Secure** with the secure mode and Corporate secure index used. For example:



  If you are in the Channel List, the active CES-128 voice encryptor is indicated by the text **Secure** <**index**> highlighted at the left of the channel screen. For example:

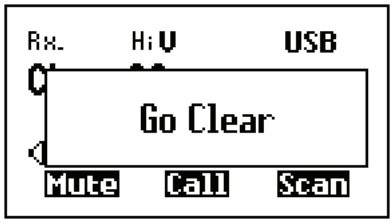


Switching off the CES-128 voice encryptor

To switch off the CES-128 voice encryptor:

- ❑ Press **SEC**.

  The transceiver responds with two low short beeps and displays **Go Clear**. For example:

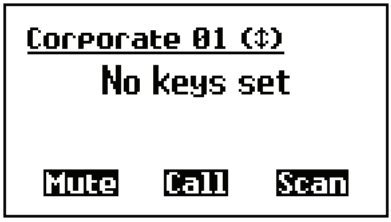


Creating a secure key in a Corporate secure index

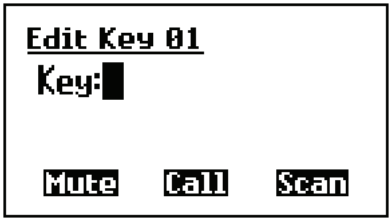
NOTE — You may create a secure key if your system administrator has enabled this feature in your transceiver.

To create a secure key for Corporate secure index 01:

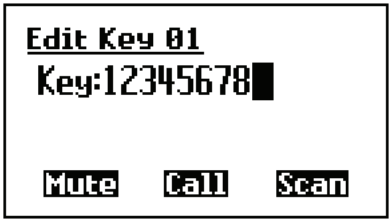
- ❑ *Hold* **SEC**.



- ❑ Scroll to **Edit Key 01**, then press ✔.

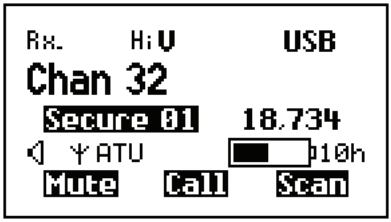


- ❑ Enter the secure key for Corporate secure index 01.



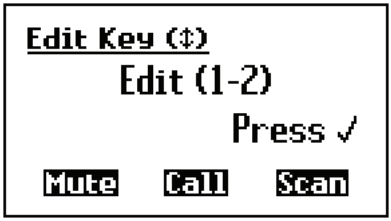
- ❑ Press ✓.

  The transceiver goes secure using the key that you entered.

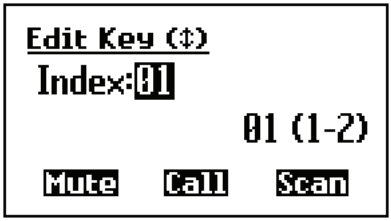


To create a secure key for the next Corporate secure index:

- ❑ *Hold* **SEC**, then scroll to **Edit Key**.

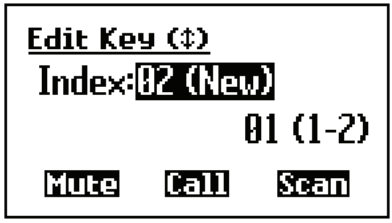


- ❑ Press ✓.

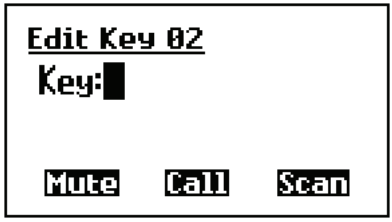


- ❑ Scroll to **Index:02 (New)**.

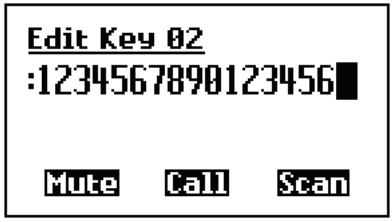
  The transceiver automatically assigns the next Corporate secure index number.



- ❑ Press ✓.

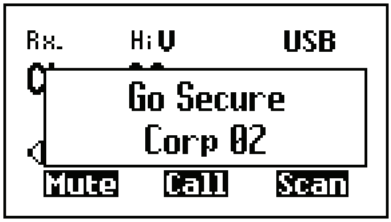


- ❑ Enter the secure key for the Corporate secure index shown.



- ❑ Press ✓.

  The transceiver goes secure using the key that you entered.



Using a PIN for private communications within an organisation

To use the CES-128 voice encryptor with a PIN:

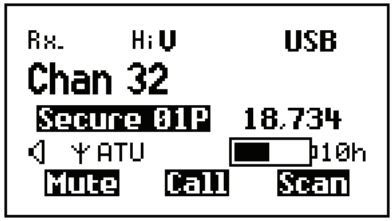
- ❑ Start a call (see page 20, *Making a selective call*).
- ❑ *Hold* **SEC** to enter a PIN for the session.

- ❑ Enter the 4-digit PIN that you have agreed to use with others for this session, then press ✔.

CAUTION The PIN must be a number that both parties know and agree upon without mentioning it over the air.

The transceiver responds with two high short beeps, and displays **Go Secure** with the secure mode and Corporate secure index used, and **PIN** to indicate that a PIN is in use. For example:

If you are in the Channel List, the active CES-128 voice encryptor is indicated by the text **Secure <index>P** highlighted at the left of the channel screen. For example:



Switching between Global and Corporate secure modes

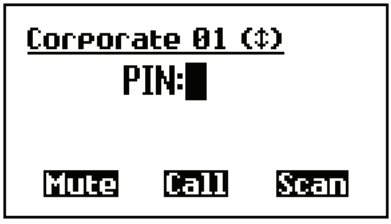
NOTE

You may switch between Global and Corporate secure modes if your system administrator has enabled this feature in your transceiver.

Whenever you switch on the voice encryptor it enters the mode that is set in the Secure Mode entry in the Control List.

To switch between the Global and Corporate secure modes while using the CES-128 voice encryptor:

- ❑ *Hold* **SEC**.



- ❑ Use ◣ or ◥ to toggle between **Global** or **Corporate** <**nn**>.
- ❑ If you want to use a PIN, enter the 4-digit PIN that you have agreed to use with others for this session.
- ❑ Press ✔.

NOTE

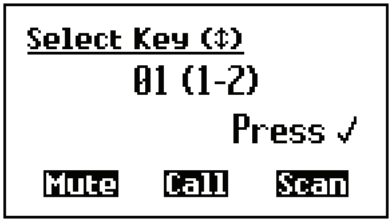
The default secure mode is not changed. Next time you switch on the CES-128 voice encryptor, the default mode is entered.

Switching between Corporate secure indexes

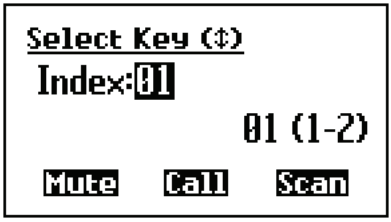
NOTE — You may switch between Corporate secure indexes if your system administrator has enabled this feature in your transceiver.

To switch between Corporate secure indexes while using the voice encryptor:

- ❑ *Hold* **SEC**, then scroll to **Select Key**.

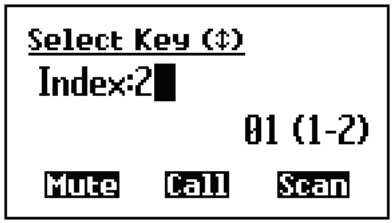


- ❑ Press ✓.



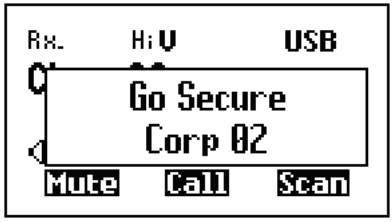
NOTE — The currently selected Corporate secure index is shown in the bottom line, followed in brackets by the total number of Corporate secure indexes that are programmed with a secure key.

- ❑ Enter, or scroll to, the number of the Corporate secure index that you want to use.



- ❑ Press ✔.

  The transceiver goes secure using the key that you selected.



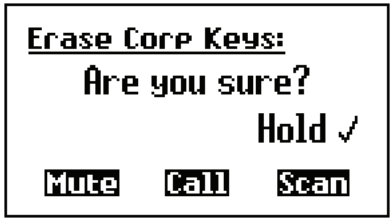
Erasing all of the secure keys

All of the secure keys in the Corporate secure indexes in the transceiver may be erased via a simple hot-key sequence.

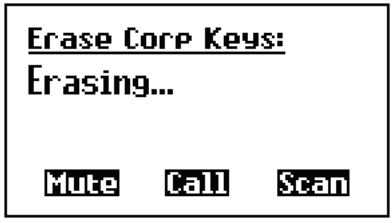
NOTE The Base secure key in secure index 0 is not erased.

To erase all secure keys:

- ❑ Press ❶ + **SEC**.



- ❑ *Hold* ✓.



Using the CES-128 voice encryptor in standby mode

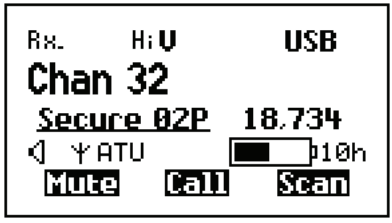
If you are operating in a communication network that has transceivers that use secure communications, non-secure communications, or both, then use the secure standby mode. When the CES-128 voice encryptor is in standby mode, you can hear all communications on the selected channel that are made by other transceivers in clear mode. If your transceiver detects an encrypted transmission from another station that is in secure mode, your transceiver will exit secure standby mode and go secure so that you can hear the secure, decrypted communication.

To enter standby mode:

- Press **SEC** to switch on the CES-128 voice encryptor.
- Press ***.

  The CES-128 voice encryptor switches to standby mode.

If you are in the Channel List, the standby voice encryptor is indicated by the text **Secure** <**index**>[**P**] underlined at the left of the channel screen. For example:



NOTE

The transceiver automatically switches from standby mode to secure mode if an encrypted transmission is received.

To exit standby mode:

- ❑ Press ✱.

  The CES-128 voice encryptor switches from standby mode.

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4 AES-256 digital encryptor option

This section contains the following topics:

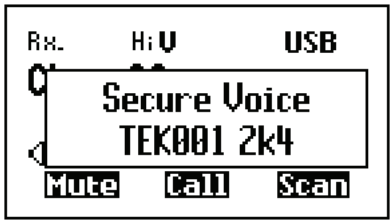
NOTE The AES-256 digital encryptor is an optional feature.

Using the AES-256 digital encryptor

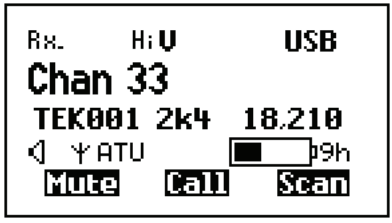
To use the encryptor:

- ❑ Start a call (see page 20, *Making a selective call*).
- ❑ Press **SEC**.

  The transceiver responds with two high short beeps, and displays **Go Secure** with the secure index and data rate used. For example:

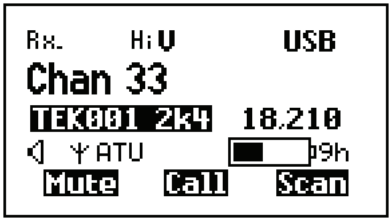


If you are in the Channel List, the active AES-256 digital encryptor is indicated by the text **TEK**<**index**> at the left of the channel screen. For example:



NOTE If you are using a user-defined prefix for the AES secure key, this is displayed instead of **TEK**.

When a digitally encrypted signal is transmitted or received, the index is highlighted.

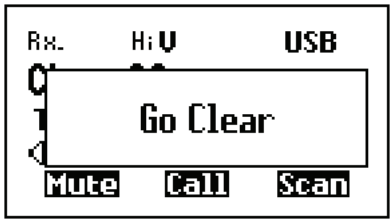


Switching off the AES-256 digital encryptor

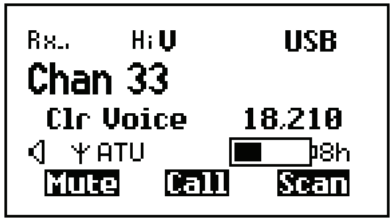
To switch off the encryptor:

- ❑ Press **SEC**.

  The transceiver responds with two low short beeps and displays **Go Clear**. For example:



  The channel screen displays that the transceiver is no longer secure (**Clr Voice**).



Using digital mute

When the AES-256 digital encryptor is switched on, you have the option of selecting Voice mute (**V**), Selcall mute (**S**), or Digital Voice Only mute (**D**). Digital Voice Only mute enables digitally encrypted voice to be processed through to the user. For information on Selcall mute and Voice mute see the reference material on the enclosed CD.

Changing the data rate

The data rate affects the speed with which digitally encrypted transmissions are sent and received. The data rate is shown as either 1k2 (1200 b/s) or 2k4 (2400 b/s) in the centre of the screen. Select 1k2 as the data rate in the first instance, then if good HF propagation conditions exist, the 2k4 rate may be selected.

To change the data rate:

- ❑ *Hold* **SEC**.

  The currently unused data rate is highlighted.

- ❑ Do one of the following:

  - To change to the new rate, press ✓.
  - To leave the data rate as is, press ✗.

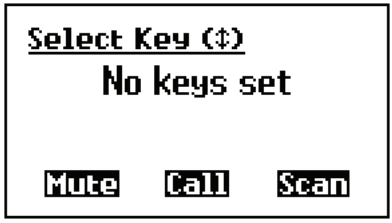
Creating a secure key in a secure index

NOTE

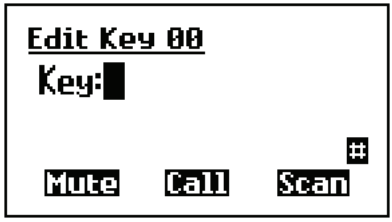
You are able to create or edit the key in secure index 00 at any time. You may create or edit keys in other indexes if your system administrator has enabled this feature in your transceiver.

To create a secure key for secure index 00:

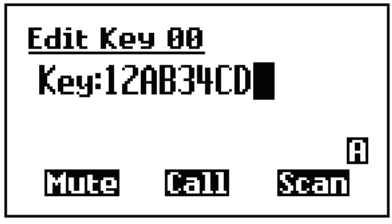
- ❑ *Hold* **SEC**, then scroll to **Select Key**.



- ❑ Scroll to **Edit Key 00**, then press ✔.



- ❑ Enter the secure key for secure index 00.



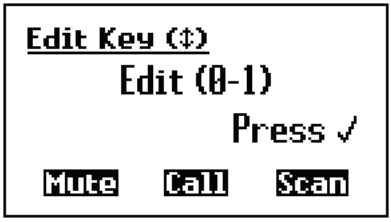
❑ Press ✓.

The transceiver goes secure using the key that you entered.

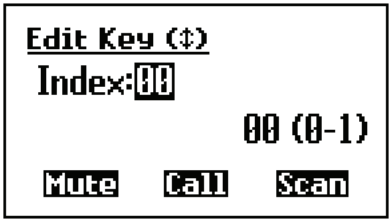
NOTE When there are less than 100 AES secure keys in the transceiver, the index is shown as a 2-digit number.

To create a secure key for the next secure index:

❑ *Hold* **SEC**, then scroll to **Edit Key**.



❑ Press ✓.

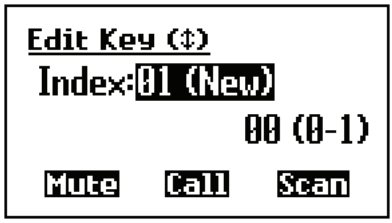


NOTE

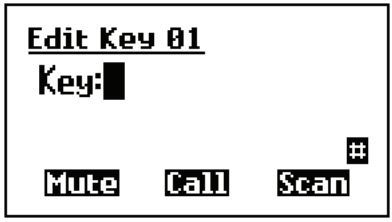
The currently selected secure index is shown in the bottom line, followed in brackets by the total number of secure indexes that are programmed with a secure key.

- ❑ Scroll to **Index:01 (New)**.

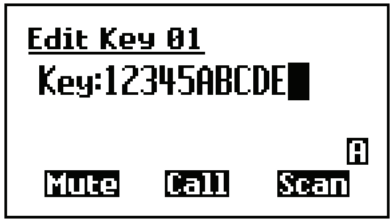
  The transceiver automatically assigns the next secure index number.



- ❑ Press ✔.



- ❑ Enter the secure key for the secure index shown.



NOTE

The AES secure key may contain up to 64 hexadecimal digits. The transceiver automatically places zeros in keys that are shorter than this.

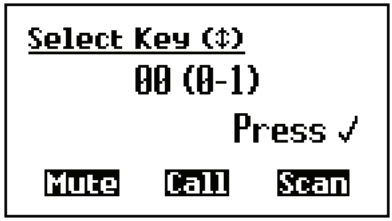
- ❑ Press ✓.

  The transceiver goes secure using the key that you entered.

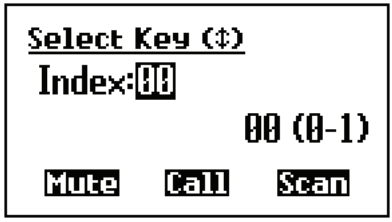
Switching between secure indexes

To switch between secure indexes while using the encryptor:

- ❑ *Hold* **SEC**, then scroll to **Select Key**.

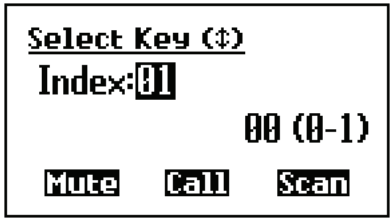


- ❑ Press ✓.



NOTE — The currently selected secure index is shown in the bottom line, followed in brackets by the total number of secure indexes that are programmed with a secure key.

- ❑ Enter, or scroll to, the number of the secure index that you want to use.



- ❑ Press ✓.

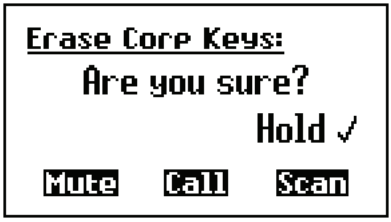
  The transceiver goes secure using the key in the secure index that you selected.

Erasing all of the secure keys

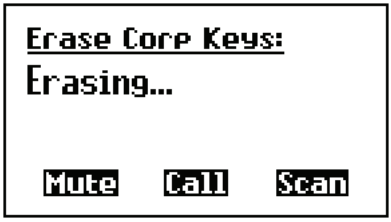
All of the secure keys in the transceiver may be erased via a simple hot-key sequence.

To erase all secure keys:

- ❑ Press ❶ + **SEC**.



- ❑ *Hold* ✓.



5 Data modem option

This section contains the following topics:

Overview

The internal RM50 Data Modem must be used in conjunction with the RC50-C email software. The data modem is capable of high-speed data transfer at speeds of up to 9600 b/s and supports MIL-STD-188-110 A/B and STANAG 4539 waveforms.

A computer may be connected directly to the 2110, or via the interface adaptor to the 2110. The data modem detects whether or not a computer is connected.

The data modem switches to power-save mode if:

- a computer is not detected
- the cable is disconnected
- the RC50-C email software is shut down

NOTE — The cable requires a specific driver to be installed on the computer. A driver is available on the RC50-C Installation CD or from www.ftdichip.com/Drivers/VCP.htm. Select the latest Windows®-certified driver that is suitable for your computer.

NOTE — For information on setting up the 2110 Manpack Transceiver for operation with the RM50 Data Modem see the reference material on the enclosed CD.

Installing the driver for the cable

To install the driver for the cable:

- ❑ Insert the RC50-C Installation CD into the CD drive of the computer to which the cable is connected.
- ❑ Click on **Install Driver**.
- ❑ If the driver provided on the RC50-C Installation CD is not suitable for your computer, do the following:
  - Download a suitable Windows®-certified driver from www.ftdichip.com/Drivers/VCP.htm.
  - Extract the files (using folder names) from the zip file.
  - Right-click on the **ftdibus.inf** file, then select **Install**.

Connecting the computer to the 2110

To connect the computer to the 2110:

❑ Do one of the following:

- Connect cable 08-06901-001 between a USB connector on the computer and the 19-way connector on the front panel of the 2110 (see Figure 5).
- Connect cable 08-06952-001 between a USB connector on the computer and the 15-way connector on the interface adaptor (see Figure 6).

NOTE Ensure that the interface adaptor is connected to the 19-way connector on the front panel of the 2110.

Figure 5: Computer connected to the 2110

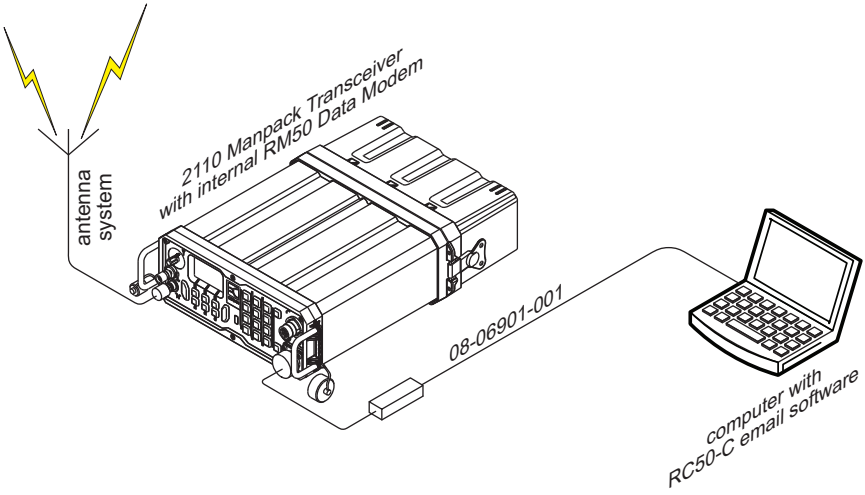
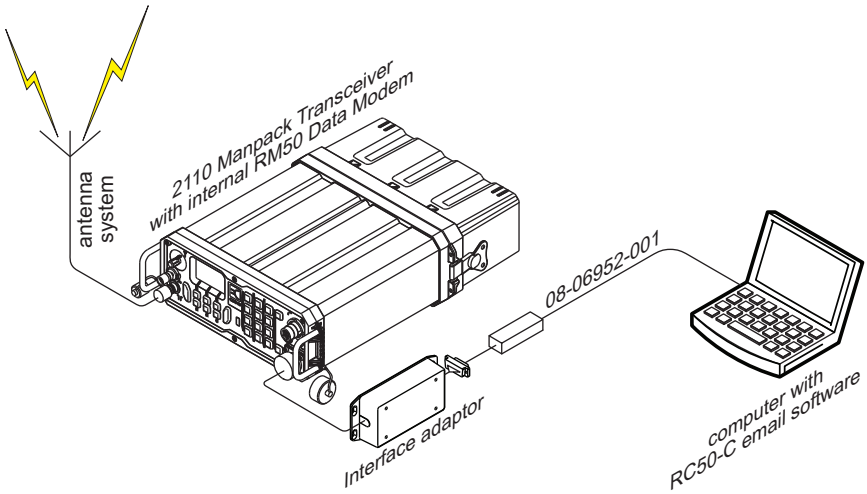


Figure 6: Computer connected to the 2110 via the interface adaptor



Operating the data modem

For information on operating the RM50 Data Modem with the RC50-C email software, see the documentation provided with this software.

6 Your 2110 series Manpack Transceiver

The 2110 series Manpack Transceiver has a range of accessories that are used in different situations. The following photographs are provided to help you identify the transceiver and its typical accessories.

Transceiver with handset

Backpacks (external frame, soft pack)

Battery packs ($LiFePO_4$, NiMH, SLA)

Whip antennas (tape, knock-down, collapsible)

Earth lead with clip and plug

Balun

Counterpoise

Anchor peg

Wire antennas/halyard

Coaxial cable

Battery chargers (AC–DC, DC–DC)

Hand-powered battery charger

Solar battery charger

Cradle, external DC for cradle, interface adaptor (2110 only)

Programming software and cable

Power amplifier

The 2110v Manpack Transceiver is primarily for voice operations and has limited interface capabilities.

The 2110 Manpack Transceiver may be installed in a vehicle for use with a 9350 Automatic Tuning Whip Antenna, and may be operated with a Codan HF data modem, a VP-116 Voice Privacy Unit, and other ancillary equipment.

For information on installing and connecting any of these items of equipment for operation with the 2110 series Manpack Transceiver, please see the information provided with the equipment.

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7 Preparing the transceiver for use

This section contains the following topics:

Charging a battery pack

Before using your transceiver, you must ensure that the supplied battery pack is fully charged. You may use:

- a 3121 AC Battery Charger (1 A), which uses a universal AC mains input of 90 to 264 V AC
- a 3122 DC Battery Charger (1 A), which may be powered from any 12 to 60 V DC source (for example, from a 12 V DC outlet in a vehicle, or from a 24 V vehicle battery)
- a 3123 Fast AC Battery Charger (3 A), which uses a universal AC mains input of 90 to 264 V AC
- a solar battery charger and lead (1 A, in full sunlight)
- a hand-powered battery charger (1 A at 60 rpm)

The Codan 3121 AC Battery Charger and 3122 DC Battery Charger are specially designed for low-noise operation, so receiver performance remains optimal while charging the battery pack via the front panel. You can continue to use your transceiver during charging when these chargers are used.

NOTE — The 3123 Fast AC Battery Charger connects directly to the battery pack for charging. You cannot use this charger through the 19-way or 5-way connector on the front panel of the transceiver.

CAUTION — Charging is recommended between 0 and 40°C (104°F). The battery will not commence charging if the temperature is at or above 40°C. If charging is already in progress, and the temperature rises to 50°C (122°F), charging is stopped automatically.

CAUTION — To prevent damage to the battery pack, Codan recommends the use of the Codan battery chargers to charge the battery pack.

Table 2: Typical charging times for Codan battery packs

Charger type	Rating (A)	Charging time (h)		
		7 Ah and 8 Ah	13 Ah	17 Ah
3121	1	10	16	
3122	1			20
Solar battery charger	1 (in full sun)			
Hand-powered battery charger	1 (@ 60 rpm)			
3123	3	3	5	7

Figure 7: Typical front panel of a battery charger

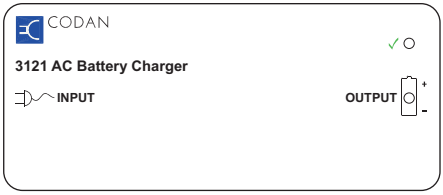


Table 3: LED indications

Charger type	LED	Status	Meaning
3121 3122	✓	Green, solid	The charger has an appropriate power supply connected.
		Off	The charger does not have an appropriate power supply connected.
	OUTPUT	Orange, solid	The charger is charging the battery pack.
		Off	The charger has finished charging the battery pack.
3123	✓	Green, solid	The charger has an appropriate power supply connected.
		Off	The charger does not have an appropriate power supply connected, or is not functioning correctly.
	OUTPUT	Yellow, solid 	The charger is charging the battery pack.
		Yellow, slow flash 	The charger has finished charging the battery pack.
		Yellow/red, alternating flash 	The battery pack has an overtemperature condition.
		Red, double flash then long pause 	The battery pack has a faulty fuse.
		Red, rapid flash 	The battery pack is unserviceable and cannot be charged.

WARNING — The battery pack should be charged with the connector facing upward and the vents clear of obstructions so that any gas created during the charging process is released.

CAUTION — Provide clear notification that charging is underway. Ensure there is adequate ventilation around the battery pack during charging.

NOTE — If the voltage of the battery pack is below 10 V, the **OUTPUT** LED on the 3121 and 3122 chargers flashes orange for a period of time before charging commences. The ✔ LED may also flash during this period.

To charge a battery pack:

- ❑ Do one of the following:
  - For a 2110 Manpack Transceiver with the battery pack attached to the transceiver, use cable 08-06215-001 to connect the output from the 3121, 3122, solar or hand-powered battery charger to the 19-way connector on the front panel of the transceiver.
  - For a 2110v Manpack Transceiver with the battery pack attached to the transceiver, use cable 08-06738-001 to connect the output from the 3121, 3122, solar or hand-powered battery charger to the 5-way connector on the front panel of the transceiver.

    NOTE — The 3123 Fast AC Battery Charger cannot be used to charge a battery pack via the front panel of the transceiver.

  - If the battery pack is detached from the transceiver, use cable 08-06214-001 to connect the output from any of the Codan battery chargers to the 6-way connector on the top of the battery pack.
- ❑ Connect the charger to an appropriate power source.

NOTE If you are using a solar battery charger, ensure that the panel is facing the sun.

NOTE If you are using a hand-powered battery charger, strap it to a tree, or attach it to the stand provided.

If the transceiver is operational during charging, the battery status indicator on the front panel screen shows that the battery pack is charging. When charging is complete, the battery status indicator is full.

NOTE It will take approximately 16 seconds following appropriate connections for the 3121, 3122, solar and hand-powered battery chargers to commence charging the battery pack.

Requirements for alternative chargers

The Codan battery packs may be charged using alternative supplies, for example, third-party solar panels or hand-powered battery chargers. In this situation, the voltage level must not exceed 15.5 V and the current must be within 1 to 3 A. These chargers must be connected between pin B (charge in) and pin A (ground) on the connector on the battery pack.

Notes on charging batteries

A battery pack requires 3 to 5 discharge/recharge cycles when new before it reaches its full capacity. In order to increase the battery service life, it is recommended that the battery pack is *not* fully discharged during each cycle. Full discharge should only be carried out periodically as follows:

Type	Full discharge
$LiFePO_4$	No full discharge required
NiMH	Two full discharge/recharge cycles every 20 charge cycles
SLA	One full discharge/recharge cycle every 20 charge cycles

For the periodic full discharge cycle, run the battery pack down to zero capacity using the transceiver. The transceiver switches off automatically when the battery pack is fully discharged.

WARNING If you are using alternative means to discharge the battery pack, the voltage of the battery pack must not go below 10 V.

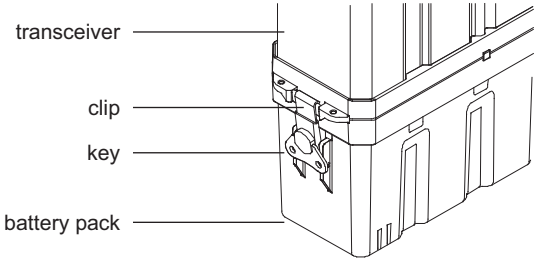
WARNING An SLA battery pack must be charged immediately after discharge to prevent damage to the battery.

Connecting a battery pack to the transceiver

The battery pack is connected to the bottom of the transceiver. It is held in place by clips with locking key latches (see Figure 8).

NOTE The battery connector on the base of the transceiver is on the same side of the transceiver as the antenna connectors on the front panel.

Figure 8: Transceiver with battery pack connected



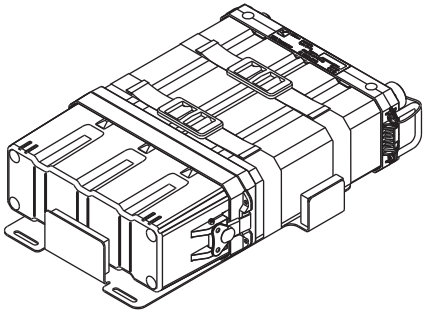
Inserting the transceiver into a backpack

All backpacks come with adjustable straps that hold the transceiver firmly in position. Some backpacks have an internal mounting frame.

To insert the transceiver into a backpack that has an internal mounting frame:

- ❑ Open the rear of the backpack to expose the mounting frame.
- ❑ Push the transceiver between the foam mounts on the frame (see Figure 9).

Figure 9: Transceiver in backpack with internal frame



- ❑ Secure the transceiver with the straps.
- ❑ Close the rear of the backpack.

To insert the transceiver into the soft backpack:

- ❑ Slide the transceiver into the backpack.
- ❑ Secure the transceiver with the adjustable strap on the outside of the backpack.

Selecting an appropriate tactical antenna

Use the following table as a guide for selecting a tactical antenna that is appropriate for your communication requirements.

Table 4: Selection guide for tactical antennas

Tactical antenna	**Communication distance**			
	0 to 100 km (0 to 60 mi)	**100 to 500 km (60 to 300 mi)**	**up to 2000 km (up to 1200 mi)**	**up to 5000 km (up to 3000 mi)**
Tape and Knock-down Whips	✓ (ground wave only)			
3 m (10 ft) Collapsible Whip	✓ (ground wave only)	✓		
Long Wire and Adaptor	✓	✓	✓	
End-fed Broadband	✓	✓	✓	
Broadband Dipole	✓	✓	✓	✓
Wire Dipole	✓	✓	✓	✓

WARNING Do not deploy an antenna at sites with overhead power cables.

WARNING Do not deploy or use any antenna if there is lightning in the area.

Connection diagrams

Figure 10: Earthing options

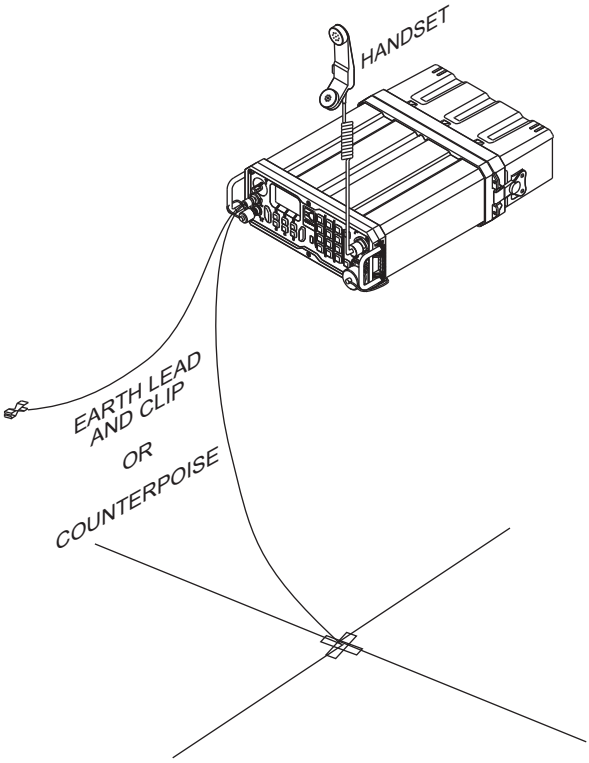


Figure 11: Antenna options

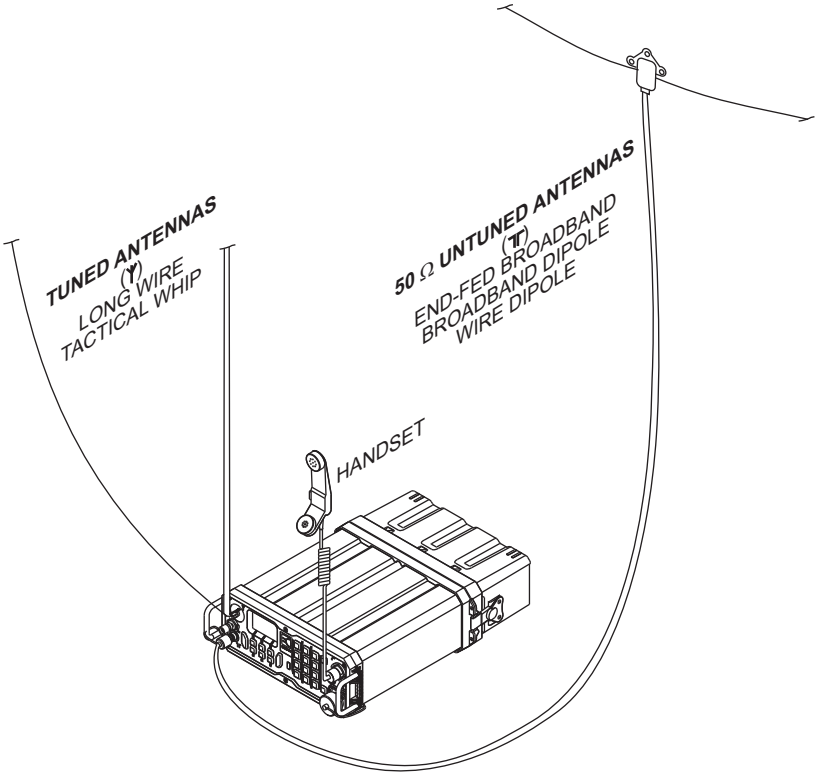
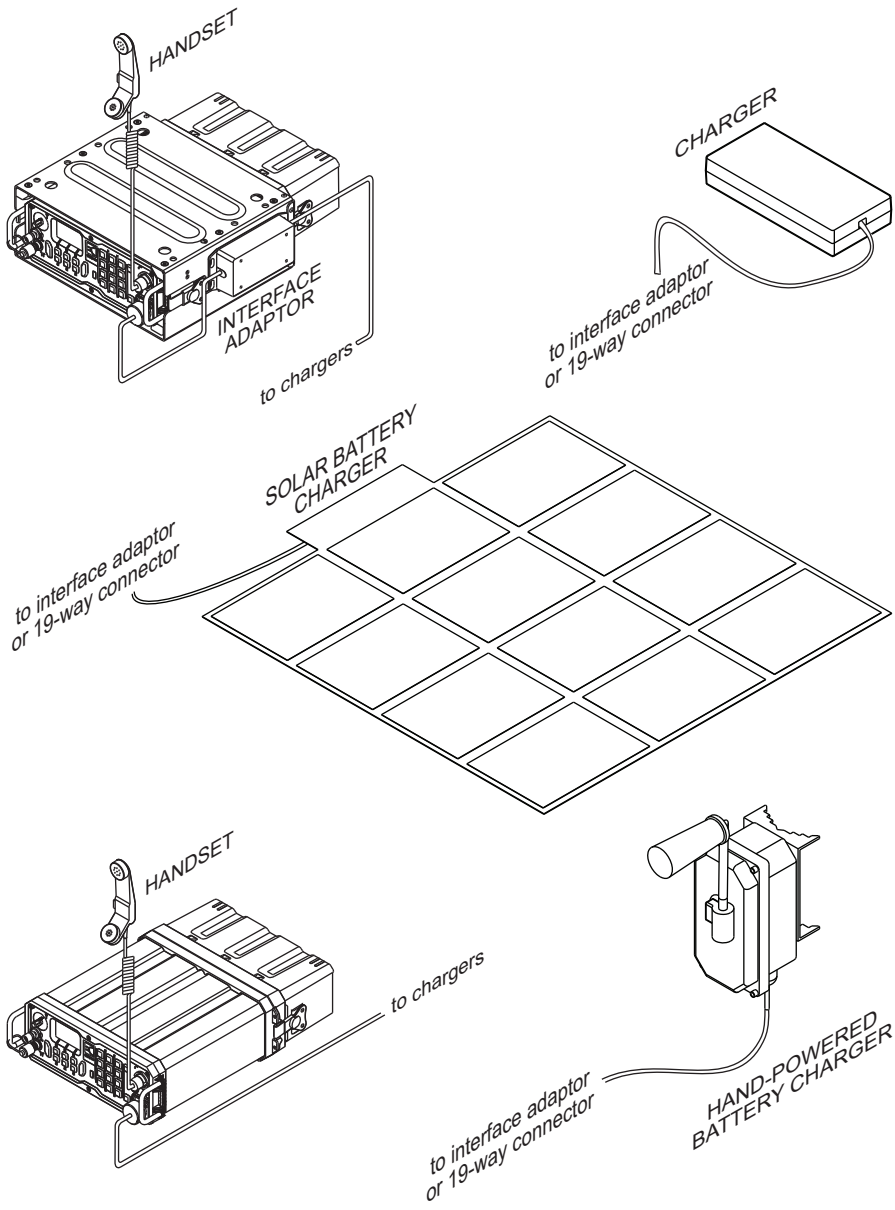


Figure 12: Charging options



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8 Troubleshooting

Below is a checklist for basic troubleshooting.

Check that:

- all connectors are dry and free from dirt
- all connections are sound
- the battery pack is connected to the transceiver and has some charge
- the selected antenna is appropriate for the distance over which you want to communicate
- the antenna is deployed correctly, oriented in a suitable direction, and connected to the transceiver
- the grounding system is adequate as per instructions provided with the antenna
- the antenna selection icon on the front panel screen matches the type of antenna you are using

If required, restart your transceiver to invoke self-testing. The self-test checks the memory, hardware, LCD and keys.

If a serious fault is reported, contact your Codan representative.

Table 5 contains some general tips for troubleshooting your transceiver.

Table 5: General troubleshooting

Problem	**Solution**
The sound from the front panel speaker is muffled	Drain any moisture from the front panel of the transceiver by turning it upside down.
Communications are not clear	Try another channel. Press PTT. If you are using a whip or long wire antenna, check that the antenna selection icon is **ATU** or **Auto** (see Figure 2 on page 11). If you are communicating over a short distance, try laying the whip horizontally for near vertical incident skywave operation. Change to a long wire antenna. If communications are still not clear, change to a dipole or broadband antenna and check that the antenna selection icon is **50** or **Auto** (see Figure 2 on page 11).
There are no supports for a wire antenna available	Lay the antenna wire on the ground. Lay the earth lead or counterpoise in the opposite direction.
I get an RF burn while transmitting	The transceiver is not adequately earthed. Attach an earth lead or counterpoise as per the instructions provided with the antenna.
GPS is not working	Ensure that the front panel of the transceiver, and hence the GPS antenna, is facing the sky so that it can receive signals from satellites.

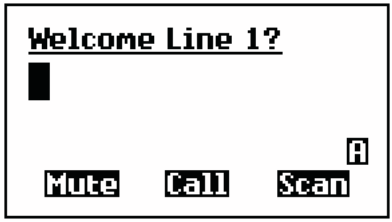
Appendix A Entering and editing text

Editing a screen

To gain access to an editable screen:

- ❑ *Hold* ✓.

  A question mark is displayed at the end of the heading to show that you can now enter and/or edit text in the setting.



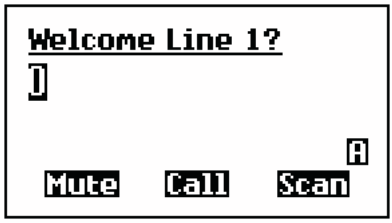
NOTE If text has already been entered on the line it is highlighted.

- ❑ Do one of the following:
  - To use the text displayed, press ✓.
  - To enter new text, start typing. When you have entered the text, press ✓.
  - To edit the text displayed, press ✕. The cursor is placed at the end of the line so you can backspace over characters and/or enter new text. When the text is correct, press ✓.

Entering text

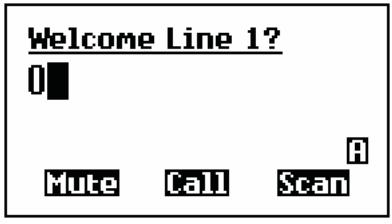
To enter text in an editable screen:

- To enter one of the letters on a key, press the key repeatedly until the letter is displayed.

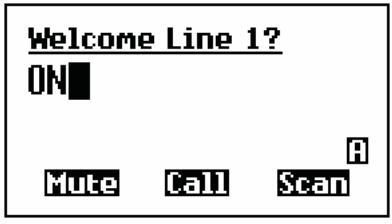


NOTE You can also *hold* the key until the letter you want is displayed, then release the key.

- To enter another letter on the same key, wait until the cursor moves to the next space...

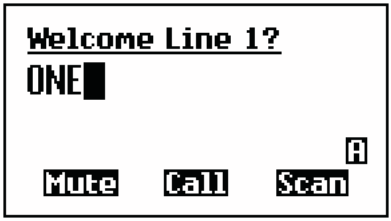


...then press the key repeatedly until the letter you want is displayed.



- To enter a letter on another key, press the key for the letter.

  You do not need to wait until the cursor moves to the next space.



Changing between alpha and numeric characters

To change between upper-case and lower-case letters and numbers in an editable screen:

- Press **#** to change the character/case indicator at the bottom right of the screen from **A** (upper case) to **a** (lower case) to **#** (numbers).

NOTE

When you are prompted to enter a call address, the characters that you can enter are determined by the call systems installed in the transceiver.

Moving the cursor

To move the cursor across the text:

- Use ◣ or ◥ to move the cursor left or right respectively.

Inserting text

To insert text:

- Use ◣ or ◥ to move the cursor to the point where you want to insert text (or a space), then press the required character key.

NOTE — If you want to insert a space, make sure that **A** or **a** is displayed at the bottom right of the screen before you press **0**, otherwise you will enter a zero.

NOTE — You can enter a special character using ✱, or 🔍 with ◣ and ◥.

Deleting text

To delete text:

- Use ◣ or ◥ to move the cursor one position to the right of the character that you want to delete, then press ✕.

Saving text changes

To save the changes you have made:

- Press ✓.

  The question mark is removed from the heading.

  If you do not want to save the text, *hold* ✕ to discard the changes.

Appendix B Using Quick Start

Quick Start provides simple methods to configure your transceiver to a basic operating state.

Quick Start is available if your transceiver has not been programmed with a profile, or contains only one station self address and network names from this default list:

- *Voice
- *Selcall
- *CALM
- !Default

When you *hold* 🔍, you should see the Quick Start entries, for example, **Add/Edit channel**, **Set scan list** etc. If these entries are not displayed, then Quick Start is not available to you.

NOTE

In countries that do not permit programming of transmit frequencies using the front panel, you are not able to add channels using Quick Start; this is achieved using NSP.

For detailed information on programming your transceiver without Quick Start see the reference material on the enclosed CD.

Opening and closing Quick Start

To open Quick Start:

❑ *Hold* 🔍.

To close Quick Start:

❑ Press or *hold* ✕.

Adding/Editing a channel

NOTE

If you have option TxD enabled, you are not able to program transmit frequencies.

If you have option TxP enabled, this entry is not available.

To add or edit a channel:

- ❑ Open Quick Start.
- ❑ Scroll to **Add/Edit channel**, then press ✓.
- ❑ Enter the name of the channel that you want to create, then press ✓.

  NOTE

  For help with entering text see page 79, *Entering and editing text*.

  If you want to use an existing channel, scroll to the channel, then press ✓.
- ❑ Enter the receive frequency in kilohertz, then press ✓.

  NOTE

  You can enter the frequency to three decimal places. Press * to enter a decimal point, then continue with entering the frequency.
- ❑ Enter the transmit frequency in kilohertz, then press ✓.
- ❑ Scroll to the mode combination you want to use, then press ✓.

  The transceiver returns to Quick Start.
- ❑ If you want to add/edit more channels in your transceiver, scroll to **Add/Edit channel** and repeat this process.

- ❑ Close Quick Start, if required.

NOTE — If you want to make or receive calls on this new channel, you must add it to your scan list.

Setting up a scan list

To set up a scan list:

- ❑ Open Quick Start.
- ❑ Scroll to **Set scan list**, then press ✓.

  The first channel in the transceiver is displayed.
- ❑ If you want to add this channel to the scan list, press ✓.

  If you do not want to add this channel to the scan list, press ✗.

  When all the channels have been viewed or you have added 15 channels to your scan list, the transceiver returns to Quick Start.

  If you do not want to scroll through all the channels in your scan list, *hold* ✓ to return to Quick Start.
- ❑ Close Quick Start, if required.

CAUTION — Each time you enter **Set scan list**, the resulting scan list overwrites the existing scan list.

Setting the time and date

To set the time and date:

- ❑ Open Quick Start.
- ❑ Scroll to **Set time/date**, then press ✓.

  The display appears with a line under the year.
- ❑ Use ◣ or ◥ to change the current setting to the correct value, then press ✓.

  The line appears under the month.
- ❑ Repeat the previous step until you have made all of the changes to the time and date.

  When all the changes have been made, the transceiver returns to Quick Start.
- ❑ Close Quick Start, if required.

Setting your station self address

NOTE

When Quick Start is available, any self address that you enter using this method replaces the previous self address. If you want to enter more than one self address, and hence disable the Quick Start features, see the reference material on the enclosed CD.

To set your station self address:

- ❑ Open Quick Start.
- ❑ Scroll to **Set my address**, then press ✓.
- ❑ Enter your station self address (maximum of 10 numeric digits for Codan Selcall networks, or 15 upper-case/ numeric characters for ALE/CALM networks), then press ✓.

  NOTE

  For help with entering text see page 79, *Entering and editing text*.

- ❑ Close Quick Start, if required.

Adding/Editing an entry in the Address List or Call Book

To add or edit an address that you call frequently:

- ❑ Open Quick Start.
- ❑ Scroll to **Address/CallBk**, then press ✓.
- ❑ Enter the name of the station or person that you want to add to the list, or use ◣ or ◥ to select an existing entry, then press ✓.

  NOTE For help with entering text see page 79, *Entering and editing text*.

- ❑ Scroll to the type of call that you want to make, enter the station address that you want to call, then press ✓.
- ❑ If you selected **Message?** or **No call type**, enter the message, then press ✓.

  If you do not want to select a message, press ✓.
- ❑ Scroll to the call system that you want to use to make the call, then press ✓.
- ❑ If you selected **Phone?** or **No call type**, select **<blank>** for the phone link that you want to use, then press ✓.

  When all the changes have been made to the call address, the transceiver returns to Quick Start.
- ❑ If you want to add more call addresses to your Address List or Call Book, scroll to **Address/CallBk** and repeat this process.
- ❑ Close Quick Start, if required.

Deleting an entry

To delete addresses, channels or phone links:

- ❑ Open Quick Start.
- ❑ Scroll to **Delete...**, then press ✓.
- ❑ Scroll to the list from which you want to delete an item, then press ✓.
- ❑ Scroll to the item you want to delete, then press ✓.

NOTE If you delete a channel from the Channel List, it is deleted automatically from the scan list.

- ❑ Close Quick Start, if required.

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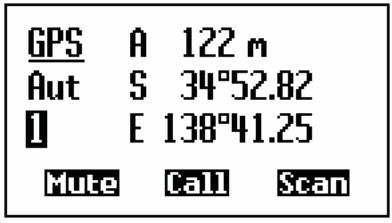
Appendix C Using a GPS receiver

When an internal GPS receiver is fitted, the GPS antenna is located behind the front panel of the transceiver (see Figure 1 on page 5). In order to obtain reliable and accurate GPS information, you should ensure that the front panel of the transceiver is pointed toward the sky and is not shadowed by overhead obstructions. If the 2110 series Manpack Transceiver is mounted in a vehicle, an external GPS antenna may be connected to the optional **GPS** connector to provide GPS signals to the transceiver. Alternatively, a GPS receiver may be connected to the 19-way connector (2110 only) to provide GPS information to the transceiver.

If you have Option GPS Enable installed, you can view your own position, and the distance and bearing to a remote transceiver from which you have received a position.

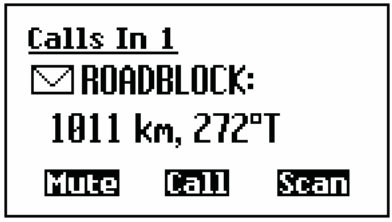
To access GPS information:

- ❑ Press **GPS** to see the GPS screen.



To view distance and bearing to a remote transceiver:

- ❑ Go to an Address List or Call Log entry containing a GPS position of a remote transceiver.



The transceiver calculates the distance to the remote transceiver and its bearing from true north with respect to your current location.

Appendix D Battery care

This section contains the following topics:

Storage of batteries

Codan recommends that batteries are fully charged prior to storage, and again prior to use. The length of time that they can be stored before recharging is necessary depends on the type of battery pack and the average storage temperature.

Table 6: Storage times of battery packs

Type	Storage time @ 20°C (70°F)	Storage time @ 30°C (85°F)
NiMH	12 months	6 months
SLA	15 months	10 months
$LiFePO_4$	3 years	18 months

Disposal of batteries

Batteries should be recycled in accordance with local government regulations and environmental acts.

WARNING Batteries must *not* be burnt or disposed of in landfill due to risk of personal injury and environmental damage.

Appendix E HF radio transmission

Overview

The HF band is the range of frequencies between 3 and 30 MHz. HF transceivers usually cover a frequency range of 1.6 to 30 MHz.

Codan HF transceivers transmit on single sidebands. This reduces the power required to send HF signals, and increases the number of channels available within the HF spectrum.

HF transceivers are primarily used for long-range communication where distances of 3000 km (1800 mi) and more are possible. Obstructions such as buildings and mountains have little effect on long-range communication. HF radio can cover such large distances because of the way the transmitted radio signal propagates.

HF radio waves propagate in three ways simultaneously:

- ground wave
- direct wave
- sky wave

Ground wave

The ground wave travels near the ground for short distances, typically up to 100 km (60 mi) over land and 300 km (190 mi) over sea. The distance covered depends upon the operating frequency, transmission power, and type of terrain.

Direct wave

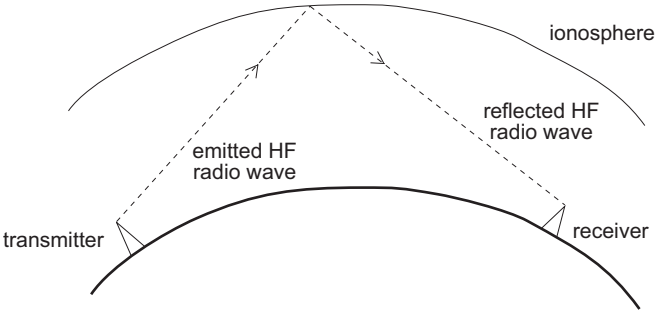
The direct wave travels in a direct line-of-sight from the transmitter to the receiver.

Sky wave

The sky wave is the most important form of HF propagation. The HF radio wave is transmitted toward the sky and is reflected by the ionosphere to a distant receiver on earth.

The reflective properties of the ionosphere change throughout the day, from season to season, and yearly.

Figure 13: The reflective properties of the ionosphere



Frequency, distance and time of day

The extent to which an HF radio wave is reflected depends on the frequency that is used. If the frequency is too low, the signal is absorbed by the ionosphere. If the frequency is too high, the signal passes straight through the ionosphere. Within the HF band, low frequencies are generally considered to be in the range of 2 to 10 MHz. High frequencies are above 10 MHz.

A frequency chosen for daytime transmission may not necessarily be suitable for night-time use. During the day, the layers of the ionosphere are thick. The layers absorb lower frequencies and reflect higher frequencies. At night, the ionosphere becomes very thin. The low frequencies that were absorbed during the day are reflected, and the high frequencies that were reflected during the day pass straight through.

Summer HF radio communications usually operate on higher frequencies than those used in winter over the same distance.

Solar activity varies over an 11 year cycle. Higher frequencies need to be used during periods of peak activity.

It is important to remember that you may need to change the frequency you are using to achieve the best communication. The general rules of thumb for HF radio communications are:

- the higher the sun, the higher the frequency
- the further the distance, the higher the frequency

Antenna selection

The selection of an appropriate antenna is critical to the success of your HF radio communications (see page 72, *Selecting an appropriate tactical antenna*).

Channels and modes

A channel is a name that is given to a frequency or a pair of frequencies, for example, ‘Channel 1’, ‘4500’ and ‘Headquarters’. The frequencies may be any frequencies within the HF range.

Each channel has one or more modes associated with it. Each mode indicates a sideband that can be used with the channel, such as USB or LSB. When you make a call you need to specify the channel *and* the mode you want to use.

Table 7 shows examples of channels and the information associated with them.

Table 7: Examples of channels and modes

Channel	Receive frequency (kHz)	Transmit frequency (kHz)	Modes
Channel 1	10600	10600	LSB, USB
4500	4500	–	AM
Headquarters	22758	23000	USB

Networks and scanning

A network is two or more stations that use the same frequencies and call system to communicate. The frequencies are allocated by a government authority and enable the network to maintain HF radio communications throughout the day and night.

The call system is the method the network uses to make and receive calls. For example, in networks that use the Codan Selcall or Open Selcall call system to make calls, the user enters the address of the station they want to call, then selects the channel/mode on which to make the call. In networks that use the ALE/CALM call system, the transceiver selects the best channel/mode for the call.

The transceiver can be set to scan the channel/modes used by your network to detect incoming calls. It is recommended that scanning is switched on when you are not using the transceiver to communicate. This ensures that you can receive calls from stations in your HF radio communications network.

Etiquette for the use of HF radio

There is a standard procedure for communicating over HF radio. Before you begin transmitting, switch off scanning, select a channel, then press PTT on the handset to initiate tuning of the antenna. Listen to the channel that you are going to use and ensure that there is no voice or data communication taking place. You may need to wait until the channel is clear or select another channel.

When you first establish communication with another station it is customary to state their call sign and then your own using the phonetic alphabet (see Table 8 on page 101). For example:

‘Alpha Bravo One, this is Alpha Bravo Two. Do you receive me? Over.’

In this example your call sign is AB2 and you are calling a station with the call sign AB1. A call sign is a group of letters and numbers issued by a government authority to identify a station. The phonetic alphabet is used to ensure that your call sign is understood.

The word ‘over’ is used to signify the end of your transmission. The transceiver may be set up to transmit a short beep when you release the PTT button on the handset. When your conversation with the other party is finished, the party that speaks last should say ‘out’.

Swearing or foul language should not be used—heavy penalties can apply.

Keep communication as short as possible.

Table 8: The phonetic alphabet

Letter	**Word**	**Letter**	**Word**
A	Alpha	N	November
B	Bravo	O	Oscar
C	Charlie	P	Papa
D	Delta	Q	Quebec
E	Echo	R	Romeo
F	Foxtrot	S	Sierra
G	Golf	T	Tango
H	Hotel	U	Uniform
I	India	V	Victor
J	Juliet	W	Whiskey
K	Kilo	X	X-ray
L	Lima	Y	Yankee
M	Mike	Z	Zulu

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Standards and icons

The following standards and icons are used in this guide:

This typeface...	Means...
Italic	a cross-reference or text requiring emphasis
Bold	a menu option in the transceiver, a button that you press, or the name of a LED

This icon...	Means...
❑	a step within a task
NOTE	the text provided next to this icon may be of interest to you
CAUTION	proceed with caution as your actions may lead to loss of data, privacy or signal quality
WARNING	your actions may cause harm to yourself or the equipment

Acronyms and abbreviations

This term...	Means...
ALE	automatic link establishment
AM	amplitude modulation
BER	bit error rate
CALM	Codan automated link management
CW	carrier wave, continuous wave
DC	direct current
DSP	digital signal processor
EMC	electromagnetic compatibility
ETSI	European Telecommunications Standards Institute
FCC	Federal Communications Commission
GPIO	general purpose input/output
GPS	global positioning system
HF	high frequency
ICNIRP	International Commission on Non-Ionizing Radiation Protection
ID	identification
IF	intermediate frequency
LBT	listen before transmit
LCD	liquid crystal display
$LiFePO_4$	lithium iron phosphate
LED	light-emitting diode
LQA	link quality analysis

This term...	Means...
LSB	lower sideband
NiMH	nickel metal hydride
NSP	NGT system programmer
PA	power amplifier
PTT	press-to-talk
R&TTE	radio and telecommunications terminal equipment
RoHS	register of hazardous substances
RF	radio frequency
Rx	receive
SB	sideband
SINAD	(signal + noise + distortion)-to-(noise + distortion) ratio
SLA	sealed lead acid
tcvr	transceiver
Tx	transmit
USB	upper sideband
V	firmware/software version

Glossary

This term...	Means...
active line	The line below the title of a list on the front panel screen. Items in the active line are selected by pressing ✔.
address	The HF transceiver equivalent of a telephone number. Your station self address is used by other stations to call you, and it is sent when you make calls to identify you as the caller. It is sometimes referred to as an ID, a station ID, or a self ID.
automatic tuning antenna	An antenna designed for use with multi-channel transceivers. It uses a microcontrolled stepper motor to give continuous tuning over the operating frequency range of the antenna.
call detect time	The length of time during scanning that the transceiver pauses on each channel in order to detect an incoming call. It is the inverse of the scan rate.
channel	Frequencies programmed in the transceiver to transmit and receive signals on air.
Channel Test call	A call that enables you to test the quality of a channel. It is sometimes referred to as a Beacon call. If you have the MIL-STD-188-141B ALE option installed (2110 only), Channel Test calls may be made in an ALE/CALM network to replace information in the LQA database, and to perform a manual sounding operation.
control cable	A cable connecting two items of equipment that allows control information to be passed between the equipment.

This term...	Means...
Emergency call	A call that enables you to trigger an emergency alarm at a specific station then speak to an operator there.
frequency	The number of cycles per second of a radio wave, usually expressed in kilohertz.
front panel	The interface that is used to control the functions of the 2110 series Manpack Transceiver. It consists of a display, keypad and connectors for the handset, antenna, ancillary equipment, and earthing.
Get Position call	A call that gets the GPS position of a specific station.
Get Status call	A call that gets diagnostic or configuration information about the transceiver at a specific station.
hot key	A key on the front panel that is pre-programmed with a macro that enables you to perform a task quickly.
Last Heard Log	A log of the last 100 on-air transmissions detected by the current station. The information gathered from each transmission includes the self address of the heard station, the time/date of the transmission, and the channel/mode used for the transmission. The Last Heard Log is available if the MIL-STD-188-141B ALE option is installed (2110 only).

This term...	Means...
link	A link is established following a 3-way handshake process. Scanning is off and a timeout, set using the Cfg In Call Timeout entry in the Control List, is active. With ALL calls and NET calls that are set to link immediately, the link establishment process is 1-way.
listen before transmit	If enabled, the automatic process that the transceiver uses to detect whether or not there is traffic on a channel and, when necessary, select another channel or inform the user that the channel is busy.
LQA beacon	A Channel Test call made in an ALE/CALM network using a Group Selective or NET address syntax. The LQA beacon tests all channels within the network to determine the best channel according to local and remote BER and SINAD measurements. On completion of the beacon, the information collected replaces the information for the channel stored in the LQA database. It is sometimes referred to as an ALE beacon. The LQA beacon is available if the MIL-STD-188-141B ALE option is installed (2110 only).
macro	A short set of instructions to automate a task you perform with the transceiver. When a macro is assigned to a key, the key becomes a hot key.

This term...	Means...
manual sounding	A Channel Test call made in an ALE/CALM network using the text **SOUNDING** as the call address. The station performs a sounding operation, which other stations use to update the information in their LQA database. Manual sounding is available if the MIL-STD-188-141B ALE option is installed (2110 only).
Message call	A call that enables you to send a message to a specific station.
MIL-STD-188-141B ALE	An option that enables you to make ALE ALL, ANY, Group Selective, NET and Wildcard calls, and perform LQA reporting and AMD messaging. This option is available for the 2110 only.
mobile station	A station that is usually mounted in a vehicle or is portable and easily transportable. It consists of a transceiver, a power supply, an antenna, control and accessory devices, ancillary equipment, and appropriate connecting cables.
mode	A type of reception or transmission you can use with a channel, comprising a sideband and an IF filter.
network	Two or more stations that use the same frequencies and call system to communicate.
Phone call	A call that enables you to connect to a public telephone network.

This term...	Means...
PTT button	Press-to-talk button, located on the left side of the handset. This button enables you to communicate during voice calls, switch mute off, cancel voice calls prior to the point where voice can be transmitted, cancel calls where data is being transmitted, and exit out of editable screens without saving changes.
revertive	A signal sent by a station in response to a call.
transceiver unit	The device that modulates audio signals onto radio frequencies that can be transmitted on air, and that demodulates the radio frequencies it receives into audio signals.
Selective call	A call that enables you to contact a specific station, then speak to an operator.
Send Position call	A call that sends your GPS position to a specific station.
sideband	A band of frequencies that is above or below a modulated carrier frequency.
station	A point of communication consisting of a transceiver, a power source, an antenna, ancillary equipment, and appropriate connecting cables.
transceiver	A transceiver unit with speaker, handset, and battery pack.

Units

NOTE Imperial dimensions are in United States Customary Units.

Measurement	Unit	Abbreviation
Length	metre (inch/feet/yard/ mile)	m (in/ft/yd/mi)
Frequency	hertz	Hz
Temperature	degrees Celsius (Fahrenheit)	°C (°F)
Time	second	s
	hour	h
Voltage	volt	V
Weight	gram (pound)	g (lb)

Unit multipliers

NOTE

Units are expressed in accordance with ISO 1000:1992 ‘SI units and recommendations for the use of their multiples and of certain other units’.

Unit	Name	Multiplier
M	mega	1000000
k	kilo	1000
m	milli	0.001
µ	micro	0.000001

About this issue

This is the fifth issue of the Manpack Transceiver 2110 series Getting Started Guide.

This issue is applicable from firmware V5.11. It describes:

- setting up the 2110 Manpack Transceiver to operate with the RM50 Data Modem
- using the AES-256 digital encryptor
- changes to the CES-128 voice encryptor

NOTE

For information on using the RM50 Data Modem, see the documentation provided with the RC50-C email software. This feature is optional.

Associated documents

This guide is one of a series of documents associated with the 2110 series Manpack Transceiver. The other documents are:

- Manpack Transceiver 2110 series Reference Manual (Codan part number 15-04135-EN) supplied on the CD inside the back cover of this guide
- Fitting Instruction: 2110/3250 Shock Mount (Codan part number 15-60010-001)
- Fitting Instruction: 2110 series Manpack Transceiver cradle 15-00139 (Codan part number 15-00139-001)
- Fitting Instruction: 2110 Manpack Transceiver cradle 15-00140 (c/w interface adaptor) (Codan part number 15-00140-001)
- Fitting Instruction: 2110 Manpack Transceiver cradle 15-00141 (c/w 9350 interface) (Codan part number 15-00141-001)
- Fitting Instruction: 2110 External DC for cradle (Codan part number 15-00143-001)
- Fitting Instruction: Power supply cover for 2110 series Manpack Transceiver (Codan part number 15-00147-001)
- Manpack Transceiver 2110 series Technical Service Manual (Codan part number 15-02071-EN)
- Manpack Transceiver 2110 series Repair Guide (Codan part number 15-04139-EN)
- Declaration of Conformity for the 2110 series Manpack Transceiver (Codan part number 19-40157)
- Expert Letter of Opinion for the 2110 series Manpack Transceiver (Codan part number 19-40244)

Appendix G Compliance

This section contains the following topics:

Introduction

This section describes how to ensure the 2110 series Manpack Transceiver complies with the European EMC Directive 89/336/EEC and the European Low Voltage Directive 73/23/EEC as called up in the European R&TTE Directive 1999/5/EC.

This section also contains the requirements for FCC compliance and C-tick.

European R&TTE Directive

The 2110 series Manpack Transceiver has been tested and complies with the following standards and requirements (articles of the R&TTE Directive):

- Article 3.1b: ETSI EN 301 489-1
- Article 3.1b: ETSI EN 301 489-15
- Article 3.2: Australian type approval according to AS/NZS 4770:2003
- Article 3.1a: assessed against ICNIRP and FCC requirements
- Article 3.1a: EN 60950

Product marking and labelling

Any equipment supplied by Codan that satisfies these requirements is identified by the CE0191 !, CE0191 or CE markings on the model label of the product.

Declaration of Conformity and Expert Letter of Opinion

The CE Declaration of Conformity and Expert Letter of Opinion for this product are listed on page 114, *Associated documents*. These documents can be made available upon request to Codan or a Codan-authorised supplier.

Protection of the radio spectrum

CAUTION

Most countries restrict the use of HF radio communications equipment to certain frequency bands and/or require such equipment to be licensed. It is the user's responsibility to check the specific requirements with the appropriate communications authorities. If necessary, contact Codan for more information.

EMC and safety notices

Radiation safety

To ensure optimal transceiver performance and to avoid exposure to excessive electromagnetic fields, the antenna system must be installed according to the instructions provided.

WARNING High voltages exist on the antenna during transmission and tuning. Do not touch the antenna during these activities. RF burns may result.

WARNING Install the grounding system or counterpoise as directed to prevent RF burns from any metal part of the transceiver.

WARNING You should not transmit from your transceiver or tune the antenna unless people are beyond the safe working distance of:

- 1.5 m (5 ft) of any part of a mobile antenna (2110 only)
- 0.2 m (8 in) from a long wire, end-fed broadband, broadband dipole, or wire dipole antenna
- 0.6 m (2 ft) from any whip antenna

Safe working distance is based on continuous exposure to CW-type transmissions, as set out in the ICNIRP Exposure Guidelines (1998) for occupational exposure. Safe working distance can be reduced with normal voice communication.

EMC

To ensure compliance with the EMC Directive is maintained, you must:

- ❑ Cover unused connectors with the protective caps supplied to prevent electrostatic discharge passing through your transceiver.

Electrical safety

To ensure compliance with the European Low Voltage Directive is maintained, you must deploy and use the 2110 series Manpack Transceiver and antennas in accordance with the instructions in the *Manpack Transceiver 2110 series Getting Started Guide*, the *Quick Reference Card* supplied with each antenna, and the *Manpack Transceiver 2110 series Reference Manual*.

When using equipment that is connected directly to the AC mains these precautions must be followed and checked before applying AC power to the unit:

- ❑ Use the standard AC mains cable supplied.
- ❑ Ensure the covers for the equipment are fitted correctly.

  The 3121 AC Battery Charger and 3123 Fast AC Battery Charger are double insulated and marked with ⧈.

CAUTION — If it is necessary for a qualified electronics technician to remove the covers during servicing, they must be refitted correctly before using the charger.

WARNING — The protective cover must always be fitted when the 3121 AC Battery Charger or 3123 Fast AC Battery Charger is connected to the AC mains.

Batteries

Battery cells are electrically live at all times and must be treated with extreme caution. They may supply high short-circuit currents even if they appear to be damaged or inoperable.

Batteries should be used to provide power to the transceiver only, using the supplied connectors.

The batteries will not charge at temperatures higher than 40°C (104°F).

Earth symbol

An antenna earth connection point is provided on the 2110 series Manpack Transceiver. The symbol shown in Table 9 is used to identify the earth on the equipment.

Table 9: Earth symbol

Symbol	Meaning
	Antenna earth

FCC compliance

FCC Part 90 certification

The 2110 series Manpack Transceiver has been tested and certified to FCC Part 90 (FCC identifier code DYY2110).

FCC Part 15 compliance

Any modifications made to the 2110 series Manpack Transceiver, the 3121 AC Battery Charger, 3123 Fast AC Battery Charger, or battery packs that are not approved by the party responsible for compliance may void your equipment's compliance under Part 15 of the FCC rules.

The 2110 series Manpack Transceiver, the 3121 AC Battery Charger, 3123 Fast AC Battery Charger, and battery packs have been tested and found to comply with the limits for a Class B device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by switching the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- reorient or relocate the receiving antenna
- increase the separation between the equipment and receiver
- connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- consult the dealer or an experienced radio/TV technician for help

C-tick approval

The 2110 series Manpack Transceiver meets the requirements of the Australian Communications and Media Authority: Radiocommunications (MF and HF equipment—Land Mobile Service) Standard 2003 (AS/NZS 4770).

Immersion of the transceiver in water

The transceiver unit and battery pack are designed to be waterproof to IP68. The units can withstand immersion in 1 m (3 ft) of water for up to 1 hour. Prolonged immersion may cause damage to the units.

If the units are immersed in water, drain any water from the front panel speaker and keypad, then wipe and air dry the connectors on the units prior to use or charging the battery pack.

If the units are exposed to salt water, they should be washed with fresh water as soon as possible.

WARNING Do not expose any uncapped connectors on the battery pack to salt water. This will damage the connector.

Register of hazardous substances

Table 10: 有毒有害物质列表（Register of hazardous substances)

部件名称 **(Component name)**	有毒有害物质或元素 **(Hazardous substances or elements)**					
2110 系列背包式电台 **(2110 series Manpack Transceiver)**	铅	汞	镉	六价鉻	多溴联苯	多溴二苯醚
2110 SSB 电台 08-06155 (2110 SSB Transceiver Unit 08-06155)	X	O	O	O	O	O
H-250/U PTT 话筒 78-08000 (H-250/U Handset 78-08000)	X	O	O	X	O	O
带夹子地线 08-06259-001 (Earth wire with clip 08-06259-001)	O	O	O	X	O	O
四线地网组件 15-00446 (Counterpoise 4-wire kit 15-00446)	X	O	O	O	O	O
无障碍鞭状天线 15-00459 (Knock Over Whip Antenna 15-00459)	O	O	O	O	O	O
* 可摺疊式鞭状天線 15-00452 (Collapsible Whip Antenna 15-00452)	O	O	O	O	O	O
弹性带式鞭状天線 15-00453 (Tape Whip Antenna 15-00453)	O	O	O	O	O	O
*12 V, 17 Ah 磷酸铁锂蓄电池组 08-07009-001 (Battery Pack 12 V, 17 Ah $LiFePO_4$ 08-07009-001)	X	O	O	O	O	O

Table 10: 有毒有害物质列表 (Register of hazardous substances) (cont.)

部件名称 **(Component name)**	有毒有害物质或元素 **(Hazardous substances or elements)**					
2110 系列背包式电台 **(2110 series Manpack Transceiver)**	铅	汞	镉	六价铬	多溴联苯	多溴二苯醚
*12 V, 8 Ah 镍氢蓄电池组 08-06185-001 (Battery Pack 12 V, 8 Ah NiMH 08-06185-001)	X	O	O	O	O	O
*12 V, 13 Ah 镍氢蓄电池组 08-06186-001 (Battery Pack 12 V, 13 Ah NiMH 08-06186-001)	X	O	O	O	O	O
*12 V, 7 Ah 密封铅酸蓄电池组 08-06188-001 (Battery Pack 12 V, 7 Ah SLA 08-06188-001)	X	O	O	O	O	O
*2110 蓄电池充电器 AC 1 A 15-00579 (2110 Battery Charger AC 1 A 15-00579)	X	O	O	O	O	O
* 蓄电池充电器 19 线输出电缆 08-06215-001 (19-way Battery Charger Output Cable 08-06215-001)	O	O	O	O	O	O
* 蓄电池充电器 5 线输出电缆 08-06738-001 (5-way Battery Charger Output Cable 08-06738-001)	O	O	O	O	O	O

Table 10: 有毒有害物质列表 (Register of hazardous substances) (cont.)

部件名称 **(Component name)**	有毒有害物质或元素 **(Hazardous substances or elements)**					
2110 系列背包式电台 **(2110 series Manpack Transceiver)**	铅	汞	镉	六价鉻	多溴联苯	多溴二苯醚
* 蓄电池充电器 6 线输出电缆 08-06214-001 (6-way Battery Charger Output Cable 08-06214-001)	O	O	O	O	O	O
* 电台背包 15-00216 (External Frame Backpack 15-00216)	O	O	O	O	O	O
参考手册光盘 (Reference Manual CD)	O	O	O	O	O	O
NSP 界面电缆 08-06237-001 (NSP Interface Cable 08-06237-001)	X	O	O	O	O	O
NSP 程序光盘 15-04164-EN (NSP Programmer CD 15-04164-EN)	O	O	O	O	O	O

O 表示该有毒有害物质在该部件的所有均质材料中的含量，均在 SJ/T 11363-2006 标准所规定的限量要求以下．

Indicates that this toxic or hazardous substance, contained in all of the homogeneous materials for this part, is below the limit requirement in SJ/T 11363-2006.

X 表示该有毒有害物质在该部件的至少一种均质材料中的含量，超出 SJ/T 11363-2006 标准所规定的限量要求．

Indicates that this toxic or hazardous substance, contained in at least one of the homogeneous materials used for this part, is above the limit requirement in SJ/T 11363-2006.

表中标有＊符号的项目属於可选择供应的部件．
Items marked with * are optionally supplied.

怎么阅读制造日期－方法如下：
How to read the date of manufacture:

产品序列号中的第一个数字或字母表示该产品在 2000 年或以后的制造年份．举例来说（数字 0-9）0=2000, 1=2001... 之后接着以字母代表制造年份 A=2010, B=2011...
The first character of the serial number provides the year of manufacture starting from the year 2000, that is, 0=2000, 1=2001...A=2010, B=2011...

产品序列号中的第二个数字或字母表示该产品的制造月份．举例来说（数字 1-9）1= 一月份， 2= 二月份 . . . 之后接着以字母 A, B, C 代表剩下的制造月份 A= 十月份， B= 十一月份 , C= 十二月份．
The second character of the serial number provides the month of manufacture, that is, 1 to 9, A to C; A=10th month, B=11th month and C=12th month.

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Appendix H Warranties

Codan's warranty statement is provided on the International Product Warranty Card. This statement sets out standard use and misuse under the terms of the warranty.

The following warranties are supplied with the 2110 series Manpack Transceiver and accessories:

Item	Warranty period
2110 series Manpack Transceiver	3 years ex-factory
$LiFePO_4$ battery pack	3 years ex-factory
NiMH battery pack	3 years ex-factory
SLA battery pack	1 year ex-factory
Battery chargers	3 years ex-factory
Antennas	1 year ex-factory
Backpacks	1 year ex-factory

NOTE

Neither the transceiver nor the battery pack has user-serviceable parts inside. Opening the units will render the warranty void unless such disassembly has been agreed to by Codan.

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CODAN

www.codan.com.au

Asia Pacific (Head Office)

Codan Limited
81 Graves Street
Newton SA 5074
AUSTRALIA

T: +61 8 8305 0311
F: +61 8 8305 0411

asiasales@codan.com.au

Europe, Middle-East & Africa

Codan (UK) Ltd
Unit C4, Endeavour Place
Coxbridge Business Park
Farnham Surrey GU10 5EH
UNITED KINGDOM

T: +44 1252 717 272
F: +44 1252 717 337

uksales@codan.com.au

Americas

Codan US, Inc.
1 Fishers Road
Pittsford NY 14534
USA

T: +1 585 419 9970
F: +1 585 419 9971

hfsales@codanusinc.com